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ENERGY PROGRAMS & TECHNOLOGY DIVISION

PRESENTATION ON CONSERVATION & ENERGY TECHNOLOGY DEVELOPMENT

TO

STANDING COMMITTEE ON RESOURCES DEVELOPMENT

1985/86 ESTIMATES
MINISTRY OF ENERGY

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MINISTRY OF ENERGY

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ENERGY PROGRAMS & TECHNOLOGY DIVISION

AGENDA

INTRODUCTION

o PURPOSE OF PRESENTATION

o OVERVIEW - 1985/86 EXPENDITURE PLANS

CONTEXT - ENERGY USE TRENDS D. TAYLOR

PANEL I - CONSERVATION PROGRAMS

- CONSERVATION & COMMUNITY PROGRAMS S. WATERFIELD

- INDUSTRY & TRANSPORTATION PROGRAMS L. PLOEGER

PANEL II - ENERGY TECHNOLOGY PROGRAMS

- ALTERNATIVE & RENEWABLE S. JOHNSON
  DEVELOPMENT & DEMONSTRATION

- RESEARCH & TECHNOLOGY B. GREVEN

SUMMARY

ENERGY PROGRAMS & TECHNOLOGY DIVISION

INTRODUCTION

PURPOSE OF PRESENTATION:

- o REVIEW RESOURCE ALLOCATION
- o RECAP ENERGY USE TRENDS
- o PROVIDE INFORMATION ON
    - MAJOR PROGRAMS
    - KEY RESULTS & IMPACTS
- o COMMENT ON FUTURE DIRECTION

ENERGY PROGRAMS & TECHNOLOGY DIVISION

OVERVIEW OF PROGRAMS & RESOURCES 1985/86

CONSERVATION

ONTARIO PUBLIC SECTOR

CONSERVATION & OIL SUBSTITUTION

7.85M

TRANSPORTATION (TEMP)

- DRIVESAFE
- TRUCKSAVE
- MUNICIPAL
- GOV'T. PROGS.
- MARKETING
- ALT. FUELS

1.11M

EDUCATION AND AWARENESS

- CURRICULUM
- CONSERVING KINGDOM
- EEO CONFERENCE

330K

CONSUMER RESIDENTIAL

- HEATSAVE & HEATSAVE NORTH
- DRAFT PROOF

1.32M

INDUSTRY/AGRICULTURE

- GREENHOUSE
- GRAIN DRYER
- SMALL HYDRO

CODES AND STANDARDS DEVELOPMENT

1.52M

PUBLIC INFORMATION AND COMMUNICATIONS SUPPORT

- PUBLICATIONS
- DISPLAYS & EXHIBITS
- SPECIAL EVENTS

320K

ENERGY TECHNOLOGY

RESEARCH AND TECHNOLOGY

- FUELS TECHNOLOGY
- BIOENERGY TECHNOLOGY
- ELECTROTECHNOLOGY
- HYDROGEN & FUSION FUELS

3.88M

DATABASE

TECHNOLOGY MONITORING AND ASSESSMENT

TECHNOLOGY TRANSFER

STANDARDS DEVELOPMENT

DEVELOPMENT & DEMONSTRATION

- ENERGY FROM WASTE
- INDUSTRIAL AND AGRICULTURAL PROCESS TECHNOLOGY
- TRANSPORTATION FUELS TECHNOLOGY
- RESIDENTIAL AND BUILDING TECHNOLOGY

9.46M

ENERGY PROGRAMS & TECHNOLOGY DIVISION

CONTEXT - ENERGY USE TRENDS

TOTAL ENERGY CONSUMPTION

HISTORIC

1970-1979	ENERGY USE GREW	33%
	ENERGY EFFICIENCY IMPROVED	6%
	OIL USE INCREASED	24%
1980-1984	ENERGY USE DROPPED	3%
	ENERGY EFFICIENCY IMPROVED	9%
	OIL USE DROPPED	17%

REASON

- PRICE
- GOV'T. PROGRAMS

} → {

- CONSERVATION BEHAVIOUR
- CONSERVATION INVESTMENT

OUTLOOK - 2000

ENERGY USE GROWS	18%
ENERGY EFFICIENCY IMPROVES	23%
OIL USE DROPS	5%

ENERGY PROGRAMS & TECHNOLOGY DIVISION

COMPARATIVE ENERGY EFFICIENCY, CANADA

CHANGE FROM 1973 TO 1982

CANADA IMPROVED	8%
U.S. IMPROVED	18%
U.K. IMPROVED	19%
NORWAY IMPROVED	17%
JAPAN IMPROVED	32%

1982 COMPARISON

ENERGY CONSUMPTION PER UNIT OF GDP
(ADJUSTED FOR CLIMATE)

- CANADA = 100
- U.S.A. = 121
- U.K. = 67
- NORWAY = 60
- JAPAN = 65

ENERGY PROGRAMS & TECHNOLOGY DIVISION

CONTEXT - ENERGY USE TRENDS

SECTORAL HIGHLIGHTS: 1984-2000 OUTLOOK

- RESIDENTIAL

SECTORAL USE DROPS	3%
ENERGY USE/HOME DROPS	25%
OIL USE DROPS	44%

- COMMERCIAL

SECTORAL USE GROWS	21%
ENERGY USE/SQ.FT DROPS	15%
OIL USE DROPS	52%

- INDUSTRIAL

SECTORAL USE GROWS	32%
ENERGY USE/UNIT GDP DROPS	3%
OIL USE FLAT	

- TRANSPORTATION

SECTORAL USE GROWS	9%
GASOLINE/CAR DROPS	25%
FREIGHT EFFICIENCY IMPROVES	1%

ALTERNATIVE FUELS: 6 - 8 % OF TOTAL

ENERGY PROGRAMS & TECHNOLOGY DIVISION

PANEL I - CONSERVATION PROGRAMS

ACTIVITIES & IMPACTS:

- CONSERVATION & COMMUNITY PROGRAMS

- INDUSTRY & TRANSPORTATION PROGRAMS

APPROACH TO CONSERVATION PROGRAMS

OBJECTIVES: TO FACILITATE THE ADOPTION OF ENERGY EFFICIENCY CONSERVATION IMPROVEMENTS AND THEREBY CONTRIBUTE TO PRODUCTIVITY AND ECONOMIC GROWTH.

BARRIERS:
- o LACK OF INFORMATION
- o TRAINING
- o REGULATORY — CODES AND STANDARDS
- o TECHNICAL EXPERTISE
- o FINANCIAL
- o TECHNOLOGY TRANSFER

MECHANISMS:
- o INFORMATION TRANSFER (MARKETING)
- o DEMONSTRATIONS
- o TARGETED PROGRAMS

SPECTRUM OF CONSERVATION ACTIVITIES

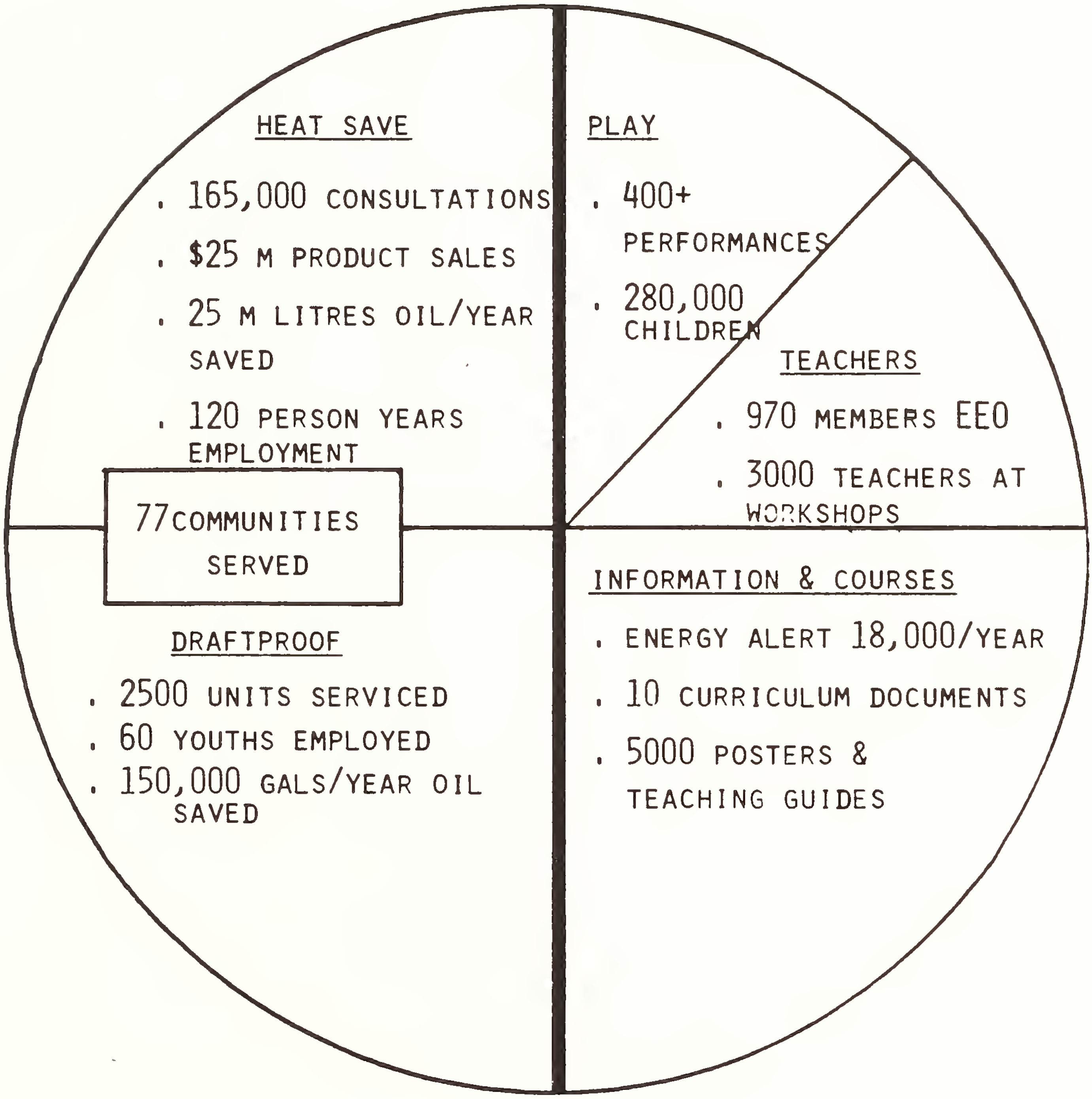
INFORMATION	PLANNING	TRAINING	OUTREACH	COMMERCIALIZATION DEMOS	TARGETED FINANCIAL ASSISTANCE

CONSUMER RESIDENTIAL

INFORMATION	PLANNING	TRAINING	OUTREACH	COMMERCIALIZATION DEMOS	TARGETED FINANCIAL ASSISTANCE
Publications	Market Evalution	Energy Advisor	Audits: HeatSave Small Business		Draftproof
Videos	Market Needs	Retail Employees			
Product Directory	Program Reviews	Energy Retrofit	Education: Plays Films		
Teaching Aids		Teachers	Shows: Exhibits Displays		
Curriculum			Conferences		
Thermography			Religious Buildings		
			Energy Educators		
			Community Action		

CONSERVATION PROGRAMS - RESULTS/IMPACTS

CONSUMER/RESIDENTIAL



HEAT SAVE

- 165,000 CONSULTATIONS
- $25 M PRODUCT SALES
- 25 M LITRES OIL/YEAR SAVED
- 120 PERSON YEARS EMPLOYMENT

PLAY

- 400+ PERFORMANCES
- 280,000 CHILDREN

TEACHERS

- 970 MEMBERS EEO
- 3000 TEACHERS AT WORKSHOPS

77 COMMUNITIES SERVED

DRAFTPROOF

- 2500 UNITS SERVICED
- 60 YOUTHS EMPLOYED
- 150,000 GALS/YEAR OIL SAVED

INFORMATION & COURSES

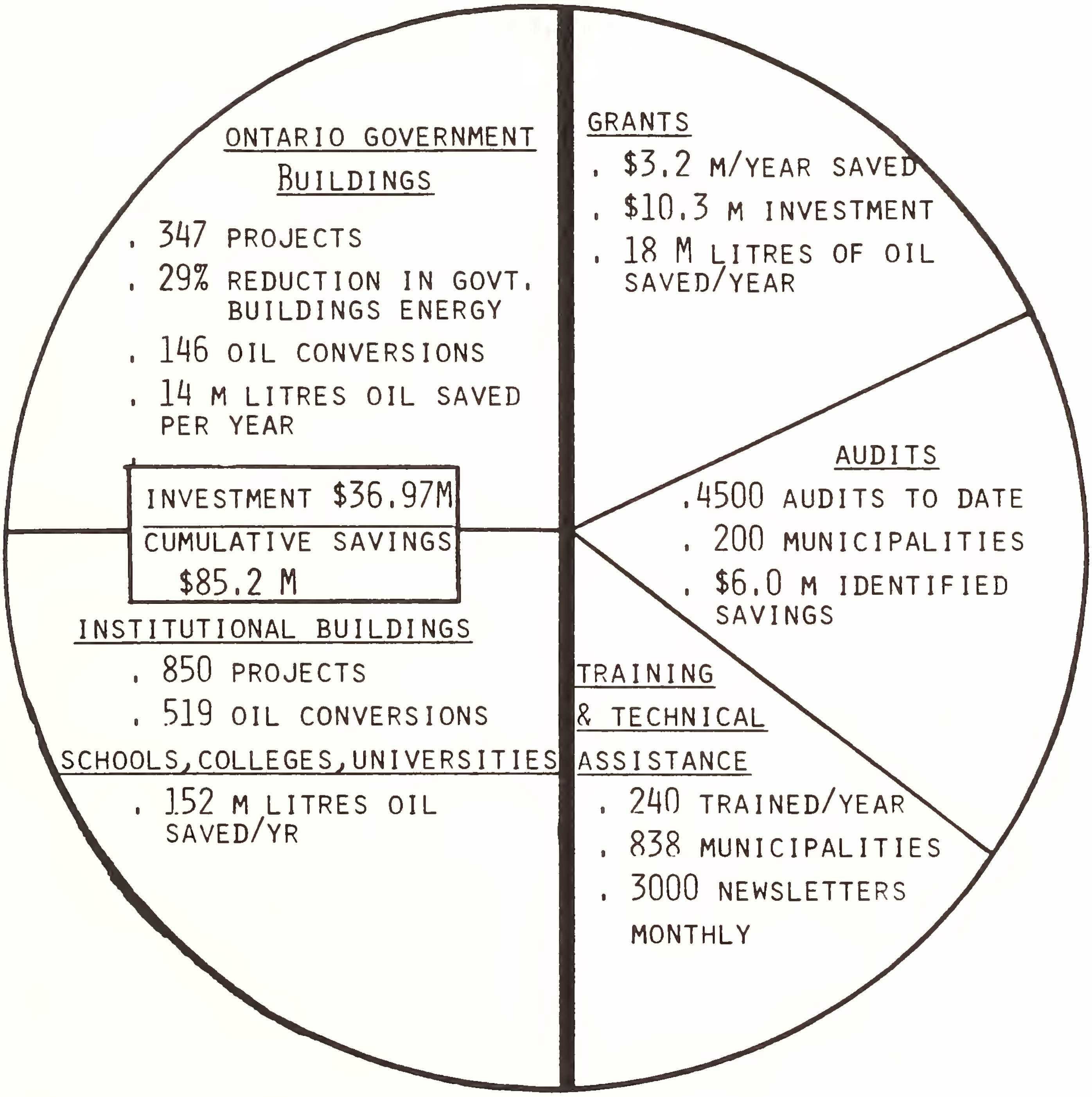
- ENERGY ALERT 18,000/YEAR
- 10 CURRICULUM DOCUMENTS
- 5000 POSTERS & TEACHING GUIDES

PUBLIC INSTITUTIONAL COMMERCIAL

INFORMATION	PLANNING	TRAINING	OUTREACH	COMMERCIALIZATION DEMOS	TARGETED FINANCIAL ASSISTANCE
Manuals	Small Municipal Needs	Municipal Auditors	Associations: University Municipal Auditors	Thermal Storage	Government: Provincial Municipal
Guidelines	Program Reviews	Building Operators/ Managers	Downtown Forums	Heat Recovery	Universities
Publications			Display	Cogeneration	Hospitals
Videos			Conferences	Computerized Building Management	Heritage Cultural Buildings
				High-Efficiency Boilers	Agencies

CONSERVATION PROGRAMS - RESULTS/IMPACTS

PUBLIC SECTOR



ONTARIO GOVERNMENT BUILDINGS

- 347 PROJECTS
- 29% REDUCTION IN GOVT. BUILDINGS ENERGY
- 146 OIL CONVERSIONS
- 14 M LITRES OIL SAVED PER YEAR

INVESTMENT $36.97M

CUMULATIVE SAVINGS $85.2 M

INSTITUTIONAL BUILDINGS

- 850 PROJECTS
- 519 OIL CONVERSIONS

SCHOOLS, COLLEGES, UNIVERSITIES

- 152 M LITRES OIL SAVED/YR

GRANTS

- $3.2 M/YEAR SAVED
- $10.3 M INVESTMENT
- 18 M LITRES OF OIL SAVED/YEAR

AUDITS

- 4500 AUDITS TO DATE
- 200 MUNICIPALITIES
- $6.0 M IDENTIFIED SAVINGS

TRAINING & TECHNICAL ASSISTANCE

- 240 TRAINED/YEAR
- 838 MUNICIPALITIES
- 3000 NEWSLETTERS MONTHLY

PRIVATE COMMERCIAL

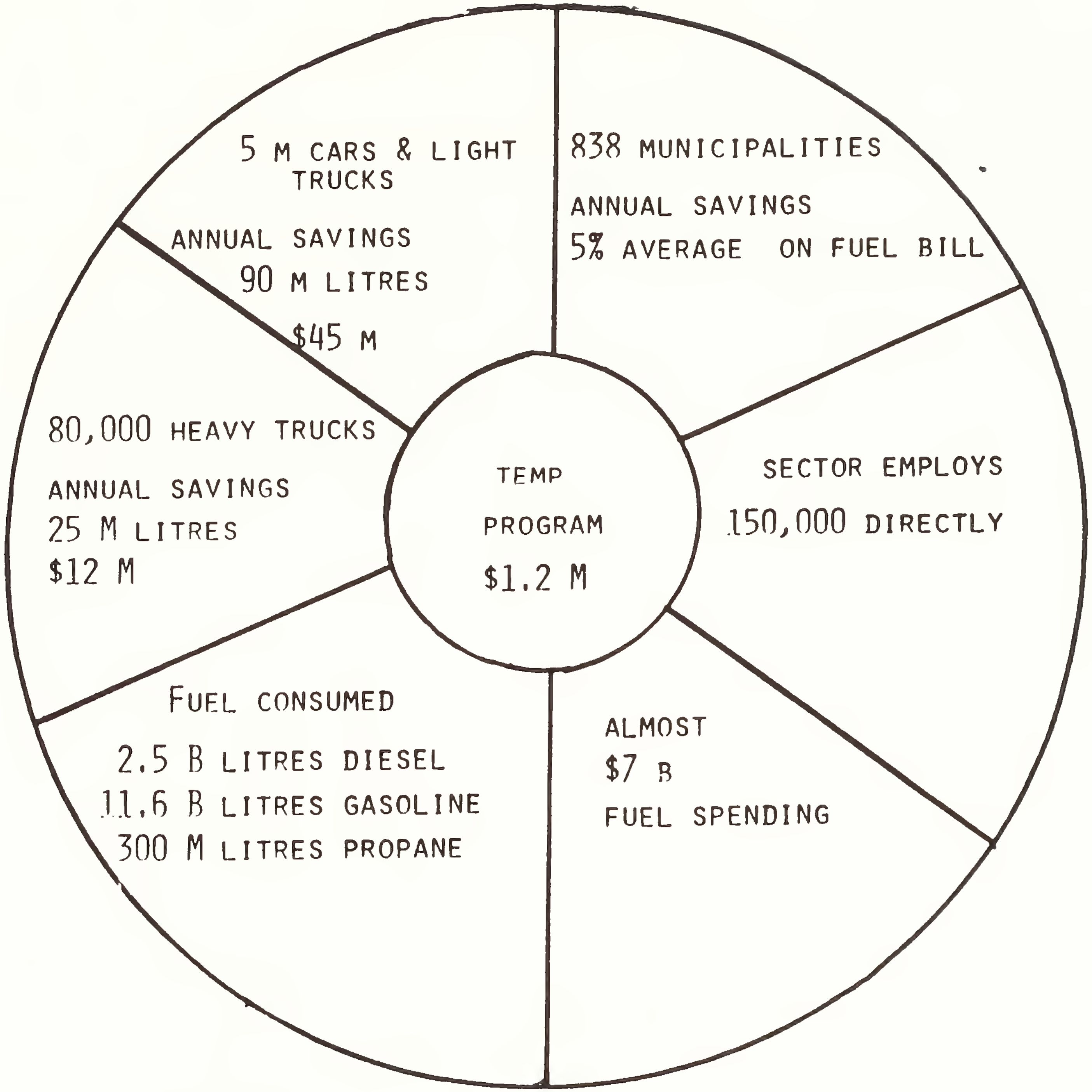
- 51 PRIVATE COMPANIES
- 6 YEAR SAVINGS - $23 M
- $10 M INVESTMENT
- 23.5% ENERGY REDUCTION

TRANSPORTATION

INFORMATION	PLANNING	TRAINING	OUTREACH	COMMERCIALIZATION DEMOS	TARGETED FINANCIAL ASSISTANCE
Publications	Guidelines: Small Municipalities	Driver Education	TEMP Display	Fuel Economy Challenge	
Technical Manuals	General Licensed Drivers	Fleet Management	AutoSave Clinics	Fire Safety Testing	
Film Videos	Urban Fleet Techniques		NGV Seminars	NGV Conversions In Government Fleets	
	Optimized Truck Routing		Trade Shows	Fleet Management Information System	
	Fuel Economy Measures		Conferences		

CONSERVATION PROGRAMS - RESULTS/IMPACTS

TRANSPORTATION PROGRAMS



TEMP
PROGRAM
$1.2 M

838 MUNICIPALITIES
ANNUAL SAVINGS
5% AVERAGE ON FUEL BILL

SECTOR EMPLOYS
150,000 DIRECTLY

ALMOST
$7 B
FUEL SPENDING

FUEL CONSUMED
2.5 B LITRES DIESEL
11.6 B LITRES GASOLINE
300 M LITRES PROPANE

80,000 HEAVY TRUCKS
ANNUAL SAVINGS
25 M LITRES
$12 M

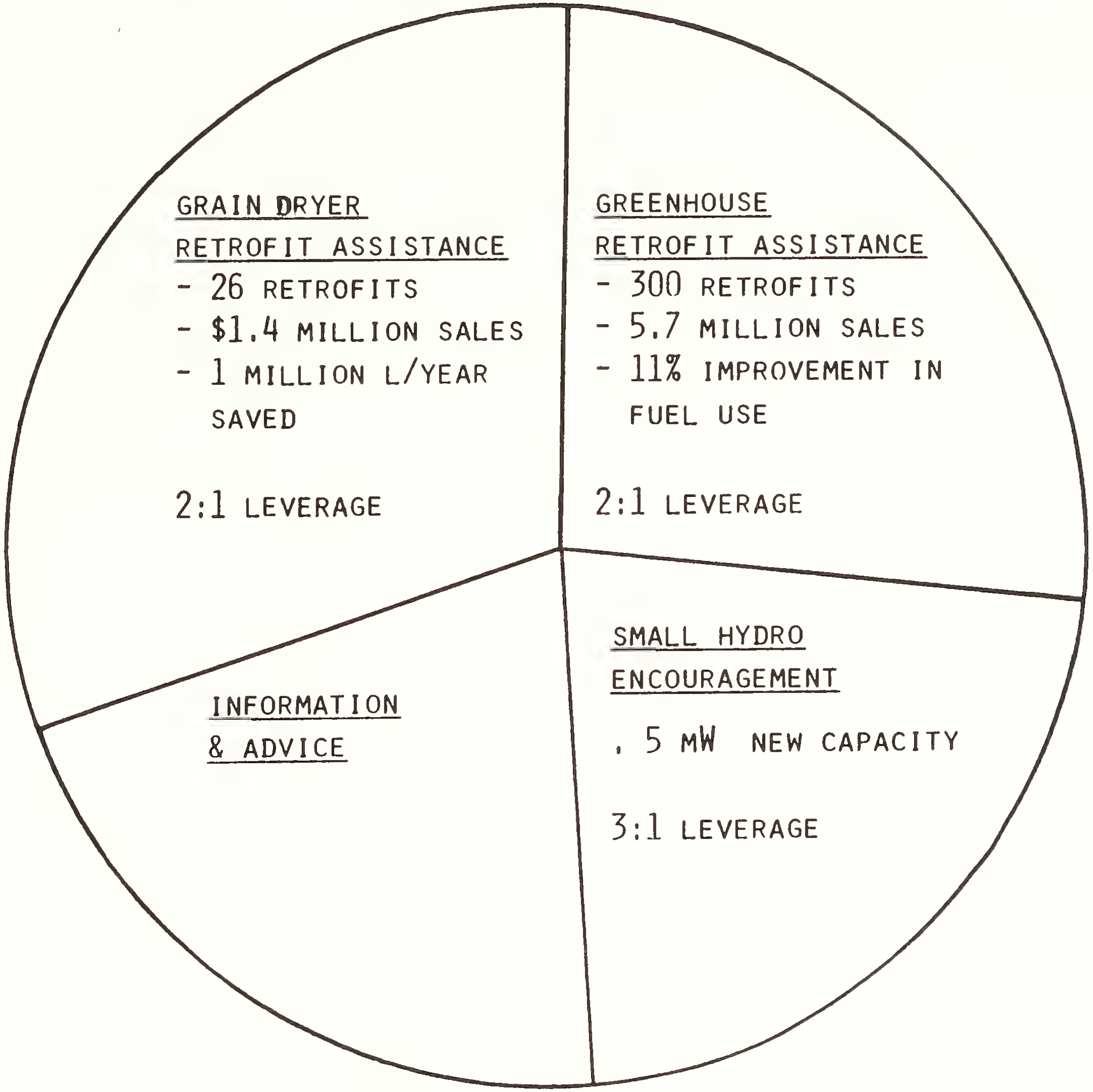
5 M CARS & LIGHT TRUCKS
ANNUAL SAVINGS
90 M LITRES
$45 M

INDUSTRY

INFORMATION	PLANNING	TRAINING	OUTREACH	COMMERCIALIZATION DEMOS	TARGETED FINANCIAL ASSISTANCE
Product Directory Videos	Food Processing Study Low Temperature Dryer Control Site Inspections	Course Development	Conferences Displays Seminar Boiler Efficiency Plastics Industry Associations (CIPEC)	Small Hydro Energy Management Heat Recovery Reverse Osmosis Waste Heat Utilization	Small Hydro Greenhouse Grain Dryer Retrofit

CONSERVATION PROGRAMS - RESULTS/IMPACTS

INDUSTRY PROGRAMS



GRAIN DRYER
RETROFIT ASSISTANCE
- 26 RETROFITS
- $1.4 MILLION SALES
- 1 MILLION L/YEAR SAVED

2:1 LEVERAGE

GREENHOUSE
RETROFIT ASSISTANCE
- 300 RETROFITS
- 5.7 MILLION SALES
- 11% IMPROVEMENT IN FUEL USE

2:1 LEVERAGE

SMALL HYDRO
ENCOURAGEMENT

. 5 MW NEW CAPACITY

3:1 LEVERAGE

INFORMATION
& ADVICE

ENERGY PROGRAMS & TECHNOLOGY DIVISION

PANEL II - ENERGY TECHNOLOGY PROGRAMS

- ENERSEARCH
- ALTERNATIVE & RENEWABLE ENERGY TECHNOLOGY DEVELOPMENT
- ENERGY TECHNOLOGY & RESEARCH

ENERGY TECHNOLOGY PROGRAMS

ENERSEARCH

O NEW PROGRAM ANNOUNCED NOVEMBER 1985 - $3 MILLION BUDGET FIRST YEAR.

O ASSISTANCE TO PRIVATE SECTOR RESEARCH, DEVELOPMENT AND DEMONSTRATION.

O STREAMLINED ELIGIBILITY/APPROVAL PROCESS.

O SCOPE - ENERGY CONVERSION, SUPPLY, CONSERVATION AND ENERGY EFFICIENT PROCESS TECHNOLOGIES.

O TARGET AUDIENCE

- MANUFACTURERS AND SUPPLIERS OF ENERGY, FUELS, EQUIPMENT AND TECHNOLOGY.

- INDUSTRIAL AND COMMERCIAL ENERGY USERS.

ENERGY TECHNOLOGY PROGRAMS

ALTERNATE & RENEWABLE ENERGY
TECHNOLOGY DEVELOPMENT

OBJECTIVE:

TO ASSIST THE DEVELOPMENT OF ENERGY TECHNOLOGIES THAT WILL:

0 PROVIDE ENERGY FROM ALTERNATE SOURCES
0 REDUCE DEMAND THROUGH CONSERVATION AND MORE EFFICIENT UTILISATION

ACTIVITY AREAS:

0 TRANSPORTATION

0 INDUSTRY

0 BUILDINGS

0 RENEWABLE ENERGY

LINKAGES: OTHER MINISTRIES, OTHER GOVERNMENTS, INDUSTRY ASSOCIATIONS, UTILITIES, MANUFACTURERS, SUPPLIERS AND USERS.

ALTERNATIVE & RENEWABLE TECHNOLOGY

TRANSPORTATION

THE TRANSPORTATION SECTOR USES 50% OF THE OIL CONSUMED IN ONTARIO AND IS THEREFORE VULNERABLE TO DISRUPTIONS IN PRICING OR SUPPLY.

PASSENGER USE 340 PJ FREIGHT USE 230 PJ

PRIORITIES		PROSPECTS
o GASEOUS FUELS		
- PROPANE	DEVELOPMENT & TESTING OF FUEL SYSTEMS, EQUIPMENT & VEHICLES	18 PJ
- NGV		6 PJ
o ALCOHOL FUELS	DRIVEABILITY, ROAD & WEATHER TESTING	15 PJ
o DIESEL SUBSTITUTION	PUBLIC TRANSIT & FREIGHT OPERATIONS	5-10 PJ

ALTERNATIVE AND RENEWABLE TECHNOLOGY

INDUSTRY

ENERGY EFFICIENT PROCESSES

0 THE DEVELOPMENT OF TECHNOLOGY AND PROCESSES WHICH USE ENERGY RESOURCES MORE EFFICIENTLY HAS THE POTENTIAL FOR SIGNIFICANT ENERGY AND ECONOMIC IMPACTS.

0 ONTARIO INDUSTRY USES APPROXIMATELY 40% OR 1,000 PJ OF ENERGY.

PRIORITIES	PROSPECTS
0 FOCUS ON AREAS AND INDUSTRIES WHERE ENERGY COSTS ARE A LARGE PROPORTION OF PRODUCT COST.	
0 INITIAL FOCUS ON SMELTING AND REFINING	
0 ASSIST THE INTRODUCTION OF EXISTING TECHNOLOGY USED ELSEWHERE	SIGNIFICANT
0 ASSIST THE DEVELOPMENT AND TESTING OF NEW TECHNOLOGY	

ALTERNATIVE AND RENEWABLE TECHNOLOGY

BUILDINGS

BUILDINGS CONSUME 34% OF ONTARIO'S ENERGY REQUIREMENTS.

PRIORITIES	PROSPECTS
0 RESIDENTIAL	
- R-2000 LOW ENERGY HOMES	75% OF NEW HOME SPACE HEATING REQUIREMENTS
- TRAINING AND QUALITY CONTROL	
- MONITORING & LONGER TERM INTEGRITY	
- INTEGRATED MECHANICAL SYSTEMS	
0 COMMERCIAL	
- FOCUS ON IDENTIFYING AND DEVELOPING RETROFIT TECHNOLOGIES & TECHNIQUES FOR SMALL APARTMENT BUILDINGS	
- HT. RECOVERY AND HT. PUMPS	

ALTERNATIVE AND RENEWABLE TECHNOLOGY

RENEWABLE ENERGY

	PRIORITIES			PROSPECTS
0	EFW/BIOMASS			
	MSW	-	A WASTE DISPOSAL OPTION & AN ENERGY OPPORTUNITY	10 PJ
	BIOMASS	-	TESTING & STANDARDS DEVELOPMENT FOR RESIDENTIAL SYSTEMS	
		-	INDUSTRIAL SYSTEM POTENTIAL GREATEST IN UTILISING WASTE PRODUCTS	20 PJ
0 0	SOLAR WIND	)	THE PROVISION OF INFORMATION AND ASSISTANCE TO DEVELOP TECHNOLOGIES & EQUIPMENT FOR OFFSHORE USE AND FOR NICHE MARKETS IN ONTARIO & CANADA	NEGLIBLE IMPACT IN ONTARIO BY 2000
0	SMALL HYDRO		POTENTIAL FOR THE DEVELOPMENT OF PACKAGED SYSTEMS	100 MW

ENERGY TECHNOLOGY PROGRAMS

ENERGY TECHNOLOGY RESEARCH

OVERVIEW OF GOVERNMENTAL R & D SUPPORT

CANADA

Funding of Energy R&D significantly Reduced.

	84/85	86/87	88/89
- Energy Panel Funding	$170 million	$101 million	$96 million

- N.R.C. Energy Division Eliminated.

USA

DOE Non-Defense R&D reduced by 10.6% to $2,800 million

Some States increasing energy R&D.

WESTERN WORLD

Energy R&D remains important. Expenditures level or slightly down in total.

Major new programs include:

- Nuclear R&D in Germany and Japan
- Agricultural Biomass to Ethanol in EEC
- Solar in Japan.

ENERGY TECHNOLOGY PROGRAMS

ENERGY TECHNOLOGY RESEARCH

ENERGY R & D PRIORITIES

- ELECTROTECHNOLOGY IN METALLURGY EG. PLASMA
- BIOCONVERSION OF INDIGENOUS RESOURCES TO FUELS AND CHEMICALS EG. WASTE WOOD TO ETHANOL.
- EFFICIENT FUEL UTILIZATION EG. SUPPORT OF CGRI
- SYNTHETIC FUELS EG. SYNTHETIC DIESEL
- NUCLEAR EG. C.F.F.T.P.
- SUPPORT OF OTHER PRIVATE SECTOR INITIATIVES - ENERSEARCH.

TO DATE THIS YEAR, MINISTRY MANAGEMENT HAVE APPROVED SIX MAJOR PROJECTS INITIATED BY THE PRIVATE SECTOR. ONTARIO FUNDING WILL TOTAL $1.5 MILLION OUT OF PROJECT TOTAL COSTS OF $5.3 MILLION.

ENERGY TECHNOLOGY PROGRAMS

ENERGY TECHNOLOGY RESEARCH

CURRENT THRUSTS OF MINISTRY RESEARCH

0 INCREASED EMPHASIS UPON APPLIED RESEARCH PROPOSED AND CO-FUNDED BY THE PRIVATE SECTOR.

0 LESS EMPHASIS UPON "LONG TERM" R&D WITH DOUBTFUL COMMERCIALIZATION POTENTIAL.

0 CO-OPERATION WITH EM&R CANADA ON A PROJECT BASIS BUT PREPARED TO MOVE ALONE ON PROJECTS BENEFICIAL TO ONTARIO.

0 INCREASED DIALOGUE AND COOPERATION WITH U.S. GOVERNMENTS, PARTICULARLY NEW YORK STATE.

0 NEED TO FOCUS ON TECHNOLOGIES PARTICULARLY RELEVANT TO ONTARIO.

CONSERVATION & ENERGY TECHNOLOGY DEVELOPMENT

SUMMARY

CURRENT ENERGY STATUS

- CANADA HEAVIEST ENERGY USER/CAPITA AND PER UNIT OF GNP
- ONTARIO'S ENERGY BILL $14 BILLION WITH 11 BILLION FROM ELSEWHERE IN CANADA
- ONTARIO'S ENERGY EFFICIENCY IMPROVED BUT STILL LAGS TRADING PARTNERS

PROGRAM THRUST

- ENERGY CONSERVATION & EFFICIENCY - IMMEDIATE IMPACT HIGH RETURN
- ENERGY TECHNOLOGY
    - CONSERVATION TECHNOLOGY)
    - ALTERNATIVE FUELS TECHNOLOGY) MEDIUM TERM IMPACT
    - LONGTERM FUELS RESEARCH) LONGER TERM IMPACT

CONSERVATION & ENERGY TECHNOLOGY DEVELOPMENT

SUMMARY

FOCUS FOR FUTURE

- IMPROVED EFFICIENCY & COMPETITIVENESS
- EXPLOIT ONTARIO BUSINESS OPPORTUNITIES
- REDUCE GOVERNMENT OPERATING COSTS
- ENSURE DIVERSITY OF ENERGY SUPPLY OPTIONS
- REDUCE ENVIRONMENTAL IMPACTS

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